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# NATIONAL COMMUNICATIONS FROM PARTIES NOT INCLUDED IN ANNEX I TO THE CONVENTION

# THIRD COMPILATION AND SYNTHESIS OF INITIAL NATIONAL COMMUNICATIONS FROM PARTIES NOT INCLUDED IN ANNEX I TO THE CONVENTION

## Executive Summary

## Note by the secretariat

1. The third compilation and synthesis of initial communications from Parties not included in Annex I to the Convention (non-Annex I Parties) is based on 52 communications received by 1 June 2001 from: Algeria, Argentina, Armenia, Azerbaijan, Bhutan, Bolivia, Cape Verde, Chile, Cook Islands, Costa Rica, Côte d'Ivoire, Democratic Republic of the Congo, Ecuador, Egypt, El Salvador, the Federated States of Micronesia, Georgia, Ghana, Grenada, Honduras, Indonesia, Israel, Jamaica, Jordan, Kazakhstan, Kiribati, Lao People's Democratic Republic, Lebanon, Lesotho, Malaysia, Mali, Marshall Islands, Mauritius, Mexico, Nauru, Niger, the Philippines, the Republic of Korea, the Republic of Moldova, Saint Vincent and the Grenadines, Samoa, Senegal, the Seychelles, Singapore, Sri Lanka, Thailand, Turkmenistan, Tuvalu, Uruguay, Uzbekistan, Vanuatu and Zimbabwe.

## I. NATIONAL CIRCUMSTANCES

2. While this report covers the national communications of only 52 out of 146 non-Annex I Parties, national circumstances spanned a wide spectrum, in terms of economic status, size and population, climatic and geographic conditions or vulnerability to the adverse effects of climate change. The level of detail at which such circumstances were reported varied considerably from country to country.

3. In respect of their development priorities, Parties indicated that agriculture, food security and water resources were of foremost importance. In addition, many Parties, particularly small island developing States, stressed that economic activities associated with coastal zones were of primary importance to them. Several Parties provided detailed information on the energy sector; this revealed a very wide disparity among Parties' circumstances and in the trends relating to current and future energy supply and demand.

## II. SUSTAINABLE DEVELOPMENT AND THE INTEGRATION OF CLIMATE CHANGE CONCERNS INTO MEDIUM- AND LONG-TERM PLANNING

4. The topic of sustainable development programmes and integration of climate change concerns into long-term planning was covered in varying levels of detail under different sections of the communications. Several Parties emphasized the need for ensuring an integrated approach in dealing with environmental issues. Parties also stressed that in order to achieve sustainable development the need for national environment plans and national climate change plans needed to be incorporated into development plans in accordance with national development priorities.

## III. INVENTORIES OF ANTHROPOGENIC EMISSIONS AND REMOVALS OF GREENHOUSE GASES

5. The coverage of reporting varied among the reporting Parties. Generally, small island developing States, some of which belong to the category of least developed countries, did not report emissions in some source categories. However, the completeness of reporting of the other Parties was similar to that of Annex I Parties. In accordance with the UNFCCC guidelines, all reporting Parties followed the IPCC Guidelines for national greenhouse gas (GHG) inventories in compiling their national GHG inventories, with most of them using the simplified default methodologies. Most Parties followed the advice of the Subsidiary Body on Scientific and Technological Advice (SBSTA) at its fourth session and used the Revised 1996 IPCC Guidelines.

6. Thirty-eight Parties provided national GHG inventories for the year 1994 and 20 Parties for the year 1990. Five Parties reported their national GHG inventories for the year 1995, and one for the year 1996. Twenty-five per cent of reporting Parties provided data for both 1990 and 1994. Twenty Parties submitted the worksheets according to the IPCC Guidelines. These worksheets provided information for replicating the inventories of Parties using default methods and therefore contributed to the transparency of the inventories. Twenty-four Parties indicated that they estimated carbon dioxide ($CO_2$) emissions from fuel combustion using the IPCC reference approach and the sectoral approach, according to the IPCC Guidelines.

7. The degree of completeness in reporting on IPCC sectors and subsectors was high. Most Parties provided data on their most significant GHG emission source and sink categories, such as $CO_2$ emissions from fuel combustion and industrial processes, $CO_2$ removals from land-use change and forestry, methane ($CH_4$) emissions from agriculture and waste, and nitrous oxide ($N_2O$) from agricultural soils and fuel combustion. About 85 per cent of reporting Parties provided emissions data for all or some ozone precursors (carbon monoxide (CO), nitrogen oxides ($NO_x$), and non-methane volatile organic compounds (NMVOC)) and half of all reporting

Parties reported on emissions from bunker fuels. Approximately one third of the Parties provided information on the uncertainty of the estimates.

8. The major contributors to the total GHG emissions, expressed as $CO_2$ equivalent, were carbon dioxide, methane and nitrous oxide, in that order of importance. The energy sector was the largest source of GHG emissions for most Parties; however, in a number of countries the agricultural sector was the largest emitter. Agriculture was the second largest emitting sector for most Parties. Fuel combustion in the energy sector accounted for the largest share of $CO_2$ emissions for all Parties, except in one Party where the industrial processes sector was the largest source. In many cases the emissions from these source categories were offset by removals by sinks within the land-use change and forestry (LUCF) sector. The land-use change and forestry sector as a whole constituted a net sink of $CO_2$ for most Parties.

9. The two primary factors that appear to affect the quality of national GHG inventories are the availability and quality of activity data and the updating of GHG inventories data on a continuous basis. In the many cases where national GHG inventories were prepared and reported for further year(s) in addition to the originally submitted inventory for the base year, the completeness, transparency and quality improved. This suggests that there is some scope for encouraging the preparation of inventories on a continuous basis. The ability of Parties to improve and update their inventories appears to be related to the availability of financial and technical assistance. Forty-nine Parties received external support in preparing their GHG inventories.

## IV. MEASURES CONTRIBUTING TO ADDRESSING CLIMATE CHANGE

10. Parties provided information on programmes containing measures which could contribute to addressing climate change by limiting the increase in GHG emissions and/or enhancing removals by sinks in the energy, agriculture, land-use change and forestry and waste sectors. Most Parties included portfolios of planned or implemented measures aimed at reducing GHG emissions by sectors and/or a list of projects aimed at reducing GHG emissions or enhancement of removals by sinks. While a limited number of Parties provided cost-benefit analysis of abatement options, others provided only rough estimates of costs.

11. The measures reported for the energy sector were diverse but generally covered the supply and demand sides and included energy conservation and efficiency, fuel switching and the use of renewable energy. Many Parties identified measures by subsectors including industrial, residential, commercial and transport sectors. The measures reported for the agriculture sector included agricultural and livestock-related activities. Measures relating to the land-use change and forestry sector included among others the preservation of existing forest cover, afforestation, reforestation, programmes for the development of commercial plantations, agroforestry, prevention and control of forest fires, control of diseases and pests, woodland creation, promotion of low impact logging, improvement of timber utilization and conversion of low productivity lands into grasslands and rangelands. The measures reported for the waste management sector included integrated waste management, waste minimization, waste recycling, composting, use of sanitary landfills, waste-water treatment and capacity-building for operation and maintenance of waste-water treatment plants. Other measures were, inter alia, rehabilitation

of waste-water treatment plants with recovery and flaring of methane, waste incineration and development of regulations to control urban industrial pollution.

12. Some Parties elaborated on the methodologies and tools used to estimate the mitigation potential of planned or implemented measures in the energy sector. Some Parties mentioned the use of models, simple cost benefit analysis and/or the judgement of experts. The mitigation analysis tools used included LEAP, ENPEP, MARKAL, STAIR, ETO, RASTR and "National Renewable Energy Laboratory methodology for the economic evaluation of energy efficiency and renewable technologies". In the agriculture, land-use change and forestry and waste management sectors, Parties provided limited information on the methodology used to estimate emissions reduction.

13. Regarding the status of implementation of the reported measures, some Parties mentioned measures that were under implementation, while others mentioned some of the measures identified under national action plans. Many Parties stated that the measures identified could be implemented if results of small-scale experimental field trials and/or the resulting socio-economic effects were satisfactory and if adequate financial and technical support were provided. In many instances, however, due to the limited information provided by Parties, it was extremely difficult to discern the level of implementation of the reported measures.

14. Many Parties included lists of projects aimed at reducing GHG emissions and the enhancement of removal by sinks; others elaborated on the associated costs and/or mitigation potential of the measures in accordance with Article 12.4 of the UNFCCC. In addition, some Parties provided project concept notes which included descriptions of environmental and social benefits of the projects.

## V. RESEARCH AND SYSTEMATIC OBSERVATION

15. Parties provided information on systematic observation which covered national plans and programmes, as well as the period of initiation of systematic observation. Information was also provided on implementation capacities with regard to the type and number of observation stations. It covered Parties' cooperation at the regional and international levels, provision of financial and technical assistance by Annex II Parties, and difficulties encountered by Parties in meeting their reporting requirements.

16. Parties provided information on research and/or systematic observation in the areas of climate change impacts, vulnerability assessment and adaptation options, and measures for addressing GHG emissions. The areas of ongoing or planned research programmes included impacts on the environment, biodiversity, forests, agriculture, water resources, coastal zones, human health and education and training. Agriculture, water resources and coastal zones were identified as the most important areas for which research and systematic observation initiatives have been undertaken. Parties presented this information under different chapters in their national communications. However, the scope, coverage and level of detail of the information provided by Parties varied significantly.

17. Climate research activities proposed by Parties included: studies on specific climate systems, ocean-atmosphere interaction, biogeochemical cycles, climatic and agro-climatic

zoning, development of fast-growing and pest-resistant trees, and soil, water and forest conservation, and impacts on agriculture, water resources, health, livestock, and tropical ecosystems. Research into measures to address climate change concentrated on the energy sector, in particular with regard to ways of improving energy efficiency and of improving the feasibility of using different types of renewable resources.

18. Parties provided information on the status of their systematic observation networks and their implementation capacity. Many Parties described the salient features of their national plans or programmes on systematic observation, which had been established to meet the needs for meteorological, atmospheric, oceanographic and terrestrial observations of the climate system. The status of these national plans, as well as the time-frame for their implementation, was not dealt with in detail.

19. Parties emphasized the need to encourage participation in both regional and international cooperation programmes for systematic observation, and outlined the difficulties encountered, as well as what was needed to improve the current level of reporting. Some of the gaps identified by Parties in the present reporting on systematic observation included: irregular observations, lack of data collection, outdated systems of collection, processing and transfer of observations, information gaps in data collection, absence of automation in stations, outdated hardware and software, lack of personnel trained to use satellite monitoring equipment, and the failure of the current monitoring network to meet the requirements of the World Climate Programme.

## VI. CLIMATE CHANGE IMPACTS, ADAPTATION AND RESPONSE STRATEGIES

20. Almost all Parties provided information on the assessment of climate change impacts, vulnerability and adaptation and reported their special needs and concerns associated with the adverse effects of climate change.

### A. Vulnerability

21. Most Parties reported on the use of various impacts and vulnerability methodologies and approaches, ranging from sophisticated computer models to qualitative assessments based on expert judgement and literature review. The methodological approaches used by Parties were generally consistent with the analytical framework provided in the IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptation. Many Parties tended to focus their assessment of the climate change impacts on the various sectors in isolation. Some others used integrated impacts assessment, which accounted for interactions between related sectors.

22. The sectors covered by the impacts and vulnerability assessments presented in most national communications were the following: agriculture and food security, water resources, coastal zone and marine ecosystems, fisheries, human health, terrestrial ecosystems, human settlements, mountain and freshwater ecosystems, and wildlife and biodiversity. The choice of sectors for analysis depended in most cases on national circumstances, and was based on the importance of a particular sector to the national economy.

23. The scope, coverage and level of detail of reporting on vulnerability to and impact of climate change varied considerably among the Parties. Some Parties provided information on both methods and results, including analysis of uncertainties associated with the methods used,

while others limited their reporting only to the results of the impacts assessment. Information on vulnerability and adaptation indicates that many non-Annex I Parties are highly vulnerable to the impacts of climate change, and that some of these Parties are already experiencing strong climatic stresses (floods, drought, salt water intrusion, desertification) which will be exacerbated by climate change. Small island developing States, and countries with low-lying coastal areas, were particularly concerned about accelerated sea level rise that could adversely affect their national economies.

24. Forty-five Parties assessed vulnerability of the agriculture sector. Generally, the results presented were more detailed and extensive for this sector than for the others, while the level of detail and depth of the presentation of the methods and results was still very diverse, ranging from detailed maps and tables to a qualitative description. The reporting Parties examined the vulnerability of more than 10 specific crops and cultivars, such as wheat, maize, rice, corn, cotton, fruits, vegetables and grapes, under a variety of climate change scenarios. In most cases impacts reported were mixed depending on the crops examined, time frames, and different locations of countries. Possible adverse effects of climate change on agriculture included lower soil moisture, greater levels of infestation by weeds and pests, the spread of infectious diseases and a decrease in biodiversity. Possible positive climate change impacts for some types of crops included an increase in crop production resulting from the longer growing season in middle and high latitudes, and carbon fertilization resulting from the increase in $CO_2$ concentration in the atmosphere. Most Parties anticipated a decline in livestock production, as a result of either a decrease in pasture areas or a decrease in the productivity of existing pastures.

25. Thirty-five Parties reported on the assessment of climate change impacts on their coastal zones. Coastal vulnerability was assessed in most cases by analysing the potential impacts of specific levels of sea level rise on coastal zone infrastructure and marine ecosystems. The presentation of results varied from qualitative considerations to detailed quantitative analysis, including tables and maps, illustrating expected land and or economic loss from inundation and erosion due to sea level rise. Half the Parties reported in qualitative terms land loss due to inundation and erosion caused by sea level rise. Some Parties specifically stressed that a rise in sea level of 0.5 to 1.0 m would affect most of their valuable agricultural land and their densely populated areas.

26. Almost all Parties noted the possible negative impact of accelerated sea level rise on coastal lands, biodiversity and marine ecosystems. The coral reefs, coastal soils, mangroves, estuarine wetlands and low-lying coastal ecosystems were expected to suffer as a result of salt water intrusion, temperature rise and increased intensity and frequency of storms.

27. Forty-five Parties reported on the expected impact of climate change on their water resources. These climate change impacts on water resources included: higher rates of evaporation from hydro-reservoirs affecting reserves available for power generation as well as a net depletion of groundwater recharge, increases in the frequency and intensity of surface runoff, decreases in surface water, reduction in aquifer recharge, soil erosion, drought and pollution, and decreases in runoff and groundwater with negative impacts on agricultural lands, grasslands and terrestrial and aquatic ecosystems. High-intensity rainfall and drought would contribute to biomass degradation and would affect fishing, food production and transport and might result in

conflict over land. Parties reported on the high sensitivity of runoff to changes in precipitation, the results being varied in terms of increase or decrease in runoff.

28. Several Parties reported the results of their assessment of vulnerability to climate change with regard to human health. They indicated that there were a lack of data and a limited understanding of the relationships between health and climate characteristics. A number of Parties pointed out that climate change and sea level rise were expected to have both direct and indirect impacts on human health. An increase in incidence was predicted for vector-borne diseases (such as malaria and dengue), water-borne diseases (such as cholera and typhoid), heat stress, cramps, dehydration, rashes, vascular and renal disorders, viral conjunctivitis and influenza. The Parties also noted that there could be an increase in cardiovascular disease as a result of increases in temperature.

29. Most countries reported on an evaluation of the impacts of projected climate change on their forests and rangelands in terms of changes in biomass or characteristics of the land. A general shift in species composition of forests and vegetation types could be expected in warmer climates. Although not directly comparable across countries due to the different models used and different magnitudes of estimated change, the average impact on forests and grasslands was found to be negative in most cases.

30. Several Parties reported on their assessment of shifts in natural climatic-ecosystem zones due to expected climate change. Some Parties reported an expected intensification of desertification and an increase in arid or semi-arid areas under all climate change scenarios. Some of the impacts on terrestrial ecosystems (including forests) analysed by Parties in their assessments included: increased fire hazard, loss of moisture, shifts in forest extent and types, loss of biodiversity, loss of fodder, increased incidence of mortality due to onset of diseases, and loss of food production.

31. The Parties indicated possible adverse effects on fisheries due to changes in temperature and salinity of sea water, and losses of productive habitats for many species due to sea level rise and associated flooding. In a number of cases the anticipated effect was reported to be mixed or uncertain. For example, the effect on deep-water fish was dependent on whether the temperature would change at great depths, which is still uncertain.

## B. Adaptation

32. The adaptation options reported for agriculture covered policy, technology and education. Among the measures most commonly mentioned by Parties were the following: measures focusing on adapting management practices to new climates (such as shifting to alternative planting dates, changes in fertilizer application, changed plant density); measures relating to the use or development of new and more resistant crops; and the introduction of different irrigation practices and special soil treatment.

33. Forty Parties discussed adaptation in the water resource sector, and three of them provided a cost assessment and or ranking of adaptation options. The detailed description of water resources adaptation by the Parties reflected their emphasis on water management as a key area for adaptation in the future. Many Parties mentioned the uncertainties associated with

climate change impacts on water resources. Nevertheless, they described adaptation options which may reduce the vulnerability of water resources to climate change as well as to current climate variability, regardless of the magnitude of future changes in runoff.

34. Many Parties reported on options to increase domestic water supply; these included prospecting for and extraction of deep groundwater, increasing storage capacity by building reservoirs and dams, and improving watershed management. The majority of Parties highlighted the extraction of groundwater as the most cost-effective measure. The other measures identified on the supply side were found to be potentially more expensive and could have adverse environmental impacts. Parties also considered outreach and technological options to reduce demand for water. These options involved measures to increase efficiency either by recycling water or restructuring water networks, or by finding ways to decrease demand, such as changing the cropping schedule to reduce the demand for irrigation.

35. Twenty-eight Parties discussed adaptation in coastal zones. These included measures to protect coastal areas, particularly economically important areas, by constructing structures such as seawalls or groynes, and/or by implementing other measures, such as beach nourishment, to counteract coastal erosion. Accommodation measures, which imply adjusting to sea level rise, including land-use changes, development of new planning and investment requirements, and more generally integrated coastal zone management, were also considered by many Parties.

36. Forest development and conservation were seen as very important to protect watersheds, combat desertification and land degradation, preserve species and sequester carbon. Related measures that were noted as adaptations included the following: the protection and rehabilitation of forests and grasslands under stress and inappropriate use, forest expansion, for example through plantations, and measures to combat mud torrents, forest fires, pests and diseases.

37. Parties also identified some adaptation options in the area of human health, fisheries and freshwater systems, human settlements and energy. Adaptation in the human health sector included measures rooted in the areas of living standards, education and sanitation, as well as in the health sector itself. Parties noted such general options as the improvement of socio-economic living standards, and increases in the awareness of hygiene and of strategies that aid vector control. Specific health sector measures included vaccination and chemical prevention measures, and monitoring of risk groups, especially in exposed territories. Most Parties mentioned the importance of research in the area of human health vulnerability and adaptation to climate change.

38. In the fisheries subsector, all Parties highlighted the importance of data collection, monitoring and further research in order to improve understanding of the impacts and to develop effective adaptation strategies. The development of flood protection in freshwater systems, and the construction of dykes, were found to help increase fish production.

39. Several Parties discussed "cross-sectoral" measures to enhance adaptive capacity and counter increased vulnerability. Among these were: the raising of socio-economic living standards, control of the demographic pattern, developing and implementing environmental legislation and integrating climate change concerns into national development plans and programmes. Other measures included developing appropriate infrastructure to reduce

vulnerability, enhancing awareness among both the population and policy makers regarding climate change impacts and options for adaptation, and promoting sustainable development.

40. The information reported by most Parties in the area of vulnerability and adaptation demonstrated a certain level of capacity to assess impacts of climate change and, to a more limited extent, to evaluate potential adaptive responses. Some Parties were able to develop scenarios and to apply a variety of biophysical impact assessment methods and models in key sectors. Several Parties demonstrated a capability to conduct integrated vulnerability assessment in key economic sectors, using different methods, including complex vulnerability indexes. Some countries used several methods to evaluate, quantify and rank adaptation options.

41. One of the most significant constraints on the assessment of vulnerability and adaptation in non-Annex I Parties was the lack of data available to meet the demands of the methodologies for these assessments, as well as Parties' inability to conduct the type of vulnerability and adaptation assessments that would generate results reliable enough to be incorporated into national planning processes. Data required as input to impact models and assessments were either not present (uncollected), inaccessible or inappropriate.

42. All Parties provided information on the institutional capacity to assess vulnerability and consider adaptation, presenting lists of institutions involved in the work. The institutions included a wide range of governmental, non-governmental, academic and private sector organizations, coordinated by a leading national institution or ministry. All Parties reported that they had established national technical teams to conduct vulnerability and adaptation analysis.

43. Many Parties also noted the lack of appropriate institutions and infrastructures to conduct systematic data collection, poor coordination within and or between the different government departments and agencies, the absence of universities and or research centres in smaller, poorer countries, and other cases where existing universities were not engaged in vulnerability and adaptation assessment work.

44. The integration of adaptation into long-term planning clearly constituted the next stage for almost all non-Annex I Parties. In some cases, adaptation options needed to be considered at the regional level (international waters, for example) and in others, adaptation options needed to be considered in a more general context including living standards, demography, legislation and sustainable development at the national level.

45. Many Parties expressed the need for more work to be carried out on integrated assessments, socio-economic assessments, identification of adaptation options and costing implications. Some Parties considered that, where possible, vulnerability and adaptation studies should be conducted at a regional or subregional level, particularly where a number of countries shared natural resources such as coastlines and water resources within major catchments or river systems.

## VII. EDUCATION, TRAINING AND PUBLIC AWARENESS

46. Parties have provided information on programmes relating to education, training and public awareness in varying levels of detail. Approximately half of the 52 Parties dedicated a separate chapter to these issues, while other Parties either incorporated them as a section of a

chapter or covered the issue very broadly within the national communication. In almost all cases, it was very difficult to distinguish clearly between the ongoing activities and programmes and those that were yet to be implemented. Parties expressed concern about the inadequacy of national programmes on education, training and public awareness relating to climate change for academic and research institutions, policy makers, practitioners in the media and industry, students and teachers in formal and non-formal educational systems, non-governmental and community-based organizations, and the public at large.

## VIII. FINANCIAL AND TECHNOLOGICAL NEEDS AND CONSTRAINTS

47. All Parties described their participation in regional and international programmes, which supplemented national efforts to conduct impact and adaptation assessment. Most Parties made their assessments with assistance from the Global Environment Facility (GEF) and its implementing agencies for the implementation of enabling activities, which included vulnerability and adaptation assessment in the context of their national communications. Other reporting Parties received technical and financial assistance through bilateral or multilateral channels, mainly from the United States Country Studies Program, the Netherlands Climate Change Studies Assistance Programme and the Finland Climate Change Assistance Programme.

48. All Parties reported on numerous needs and constraints in the preparation of their national communications as well as in implementation of the Convention. These needs varied greatly amongst Parties. Parties reported on needs relating to the issue of data availability, collection and organization. Most Parties expressed needs relating to the improvement of quality and or comprehensiveness of all or some of the following: national GHG inventories and GHG mitigation, impacts, vulnerability and adaptation studies. Other problems encountered included inappropriateness of some methodologies, tools and technologies available for carrying out the above-mentioned studies. The need to promote education, training and public awareness and research and systematic observation was also deemed essential by many Parties. Limited human, financial and institutional capacities were recurrent features for many Parties.

49. Access to and adequacy of methodologies and tools, as well as reliable good quality data, were recurrent constraints on almost all Parties in addressing climate change needs. Many Parties indicated the importance of being granted further financial and technical assistance in order to improve and maintain national capacity for the development of integrated mitigation strategies and policies. Specific needs included: the promotion of renewable energies and achievement of energy efficiency, expansion of sink capacities, research into sustainable agricultural practices, forest fire management, strengthening of national policies to manage solid and liquid wastes, and the promotion of the use of more energy-efficient vehicles. Parties also stressed the need to strengthen policy formulation and planning, and the participation of key stakeholders in national, regional and international programmes on climate change as well as the need to enhance capacity to prepare mitigation projects for funding.

50. Almost all non-Annex I Parties reported difficulties in preparing their GHG inventories as a result of a lack of technical and institutional capacities as well as of good quality data. Many Parties reported that the emission and conversion factors were not appropriate and applicable to their situation, while some Parties stressed the necessity to adapt the methodology to their contexts. The needs consisted of assistance to ensure continuous collection and maintenance of

activity data and improvement of the accuracy and reliability of these data, the enhancement of local technical capacity and expertise and the development of country-driven methodologies to estimate emission factors and specific capacity relating to the energy, transportation, agriculture and waste management sectors.

51. Almost all Parties encountered constraints in completing the vulnerability assessments and indicated that the assessments were not exhaustive enough to cover all sectors, mainly due to a lack of capacity, technology methodology and good quality data, as well as inadequate financial resources. Further assistance was required for undertaking and upgrading studies on integrated assessments, differentiating between increased frequency and severity of extreme events arising from human-induced climate change and from those arising from natural climate variability, the improvement and development of climate change socio-economic and sea level rise scenarios, the development of climate impact models and the enhancement of monitoring capacity. The main sectors of concern were water resources, agriculture, coastal zones, human settlements, population and health.

52. Most Parties reported on financial and technological needs for evaluating or implementing identified measures to adapt to the adverse impacts of climate change. Parties further stressed that financial assistance to improve information sharing, education and training and scientific research are essential to the effective implementation of comprehensive adaptation plans.

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